

*The inventions of clever men threaten the survival of the species. As a defense against the hazards of modern technology, health agencies have developed specific programs to control hazards in the industrial environment.*

## Is Man Becoming Obsolete?

DAVID E. PRICE, M.D.

**I**N A RECENT television program, James Thurber, in his casual way, noted that we are now living on the brink of "was." This rather neatly sums up the growing public concern that, even if we escape destruction by war, something else, probably subtle, insidious, and gradual, may eventually cause us to become a "has been" species.

The rationale for such a view is not entirely unreasonable. The technological world man has created bombards us with countless products which combine within our bodies as well as in our environment to cause reactions that we as yet know almost nothing about.

Radiation is now perhaps the major current cause of concern. How much radiation will the infants of 1959 absorb in the course of their lives from food, water, air, medical and dental treatments, and occupational exposures? What effect will it have upon them and their descendants? At this stage, we just do not know, and unfortunately the mass investment in worry is probably greater than the investment in efforts to find out.

But radiation is only one aspect of man's changing environment. With the growth of chemical industry, organic materials of un-

known toxicity are being introduced at an ever-accelerating pace. As Dr. William Shepard has observed: "Chemists can produce and put into use a dozen new products while we painstakingly lay out a 3-year research project to test the toxic qualities of one." If we live in the city, we wonder whether fumes from industry, some of them odorless and invisible, are poisoning our air. If we live in the country, we worry about the effects of the herbicides and pesticides which are applied to the land and then leach into the streams.

Water shortage increases the potential danger of the modern industrial environment. It is estimated that in only 20 more years our daily use of water will almost exactly equal our daily supply. And we recall that it was lack of water which caused the dissolution of the great civilizations of the Middle East.

In a way, we are modern Midases. Everything we touch and change adds to our wealth, yet in the process loses something of its intrinsic value.

Small wonder that we all live under the shadow of a haunting fear that something may corrupt the environment to the point where man joins the dinosaurs as an obsolete form of life. And what makes these thoughts all the more disturbing is the knowledge that our fate could perhaps be sealed 20 or more years before the development of symptoms.

Yet despite these ominous developments, there is an almost renaissance buoyancy in

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our outlook as we probe outward far into space and inward to the microcosm of the living cell. Stronger than fear is the conviction that what may at times appear to be the shadow of extinction is in reality the darkness preceding the dawn of the greatest era of progress man has ever known.

### **New Emphasis on Industrial Hygiene**

Whether or not this proves to be true, industrial hygienists are in a peculiarly key position to predict, and in some measure to control, the nature of our future environment. Increasingly, the work environment will represent the world in miniature so that every advance in occupational health programs may contribute to advances in community health. Consequently, the problems of specific jobs have a wider significance than ever before. The day has passed when the industrial hygienist can discharge his duty by reducing the worker's exposure to concentrated toxic products. The industrial hygienist must now also be concerned about the gradual deterioration in health that may result from prolonged small-dose exposure to toxic materials. And since this is precisely the concern of those responsible for controlling the general community environment, it is not surprising to find that many States and communities are calling upon their occupational health personnel to assume major responsibility for newly developing programs in community air pollution and radiological health.

At the same time, occupational health programs cannot be neglected, as these facts clearly show :

- The 484 professional personnel staffing the 76 occupational health agencies in 40 States can cover only 10 percent of the Nation's work force.
- More than half of the industrial plants in the United States do not have even the most rudimentary type of occupational health program.
- Only about one-third of the Nation's workers are employed in large plants which may be able to afford the full range of preventive health services which is recognized to be desirable for all workers.
- Longstanding occupational health prob-

lems, such as silicosis, which we know how to control, continue to affect thousands of workers.

With so much unfinished business in established programs, one may well wonder how to meet new demands without spreading efforts too thin.

This is a question which concerns us in the Public Health Service and this is why our occupational and environmental health programs are developing and expanding those services which will be most helpful to States in meeting added responsibilities.

### **Air Pollution**

The air pollution programs of the Public Health Service officially date from 1955 when the Federal Research and Technical Assistance Act authorized the Service to help alleviate the problem of community air pollution by providing grants-in-aid and technical assistance to States and by conducting and supporting research and training programs in the air pollution field. Actually, our work on air pollution began with work on occupational health. Industrial hygienists have always recognized that pollution of the air in the working environment is a hazard.

Removing noxious contaminants from the plant to the outside air has been a popular solution to the industrial aspect of this problem, but we are increasingly aware that it is not a satisfactory solution either for the plant or for the community. Our dissatisfaction stems from a growing realization that diluted amounts of toxic materials breathed over a long period of time may have harmful effects as surely as more concentrated amounts breathed over a shorter time period.

We do not, however, have conclusive evidence that this is true. One of the greatest needs in the air pollution field is epidemiological studies that will help us determine the effects of low-level exposures. Inplant studies as well as communitywide epidemiological studies could be most helpful. Through the air pollution research grants program, the Service hopes to encourage more epidemiological studies. Within the Service, we are comparing mortality and morbidity data with various indexes of air pollution and are finding that cities with heavy

pollution loads tend to have higher than average death rates for certain diseases. This is a crude approach, however, and it will take a long time to study other factors which may be contributing to these findings and to determine the true significance of these observations.

The current community study in Nashville, Tenn., which involves both epidemiological observations and intensive sampling and analyses of air pollutants, is another research effort by the Public Health Service which seems promising.

Efforts to relate community air pollution to health may eventually have an effect on standards for the quality of air in the work environment. By the same token, studies of low-level exposures in the work environment may accelerate discovery of valuable clues to the hazards of community air pollution.

Probably the most publicized project in the Service's air pollution research is the study of automobile exhaust gases which is now being initiated at the Robert A. Taft Sanitary Engineering Center in Cincinnati. For this study, we are reproducing solar irradiation effects on diluted automobile exhaust gases and will expose both plants and animals to this environment. This is one of the most comprehensive studies of the automobile exhaust problem that has ever been attempted. Since many of the substances contained in automobile exhaust gases may also be emitted during metal cleaning operations, drycleaning, printing, and the manufacture of plastic, rubber, and other products, the yield in knowledge may be invaluable in controlling industrial health hazards.

Of more immediate significance is the training program. Since 1955, when the air pollution training program started, from 7 to 10 specialized courses, each lasting 1 or 2 weeks, have been given annually by the Public Health Service. More than 2,000 persons, chiefly engineers and chemists, have taken these courses. Most of them have been from public agencies, but a number have also come from private industry; in fact, last year one-third were from industry. The courses were originally given only at the Sanitary Engineering Center in Cincinnati, but for the past 2 years they have also been given in various other parts of the country.

There has been a growth in the number of colleges and universities establishing or strengthening air pollution courses. The Public Health Service has awarded 21 traineeships to students taking full-time graduate-level air pollution training and has awarded grants to 10 universities for graduate-level air pollution curriculums. This financial support for training, although relatively small, has given impetus to the whole training movement and, at present, 14 universities offer graduate courses for advanced degrees in subjects related to air pollution.

Through the Public Health Service alone, there are now three immediate sources of help.

First, a staff of specialists, physicians, engineers, chemists, and others who comprise our total air pollution program are available as consultants on new or unusual problems. We recognize that it is uneconomical for States and communities to employ regularly persons whose highly specialized skills would rarely be needed, but there is enough demand for such specialists to warrant the development of a central staff available wherever and whenever the need arises. Consequently, for the past several years, we have been recruiting such a group of specialists. They work with our regional consultants in meeting special needs.

Second, the trainees who attend Public Health Service courses and seminars form a reservoir of personnel available to State and local agencies.

Third, existing staffs from these agencies can increase their competency in the air pollution field by attending Public Health Service courses and seminars.

The National Conference on Air Pollution which met last November focused nationwide attention on the air pollution problem and I believe has stimulated industries and various other nongovernmental agencies to step up their activities in research, training, and control. Within government, the conference gave impetus to efforts to extend the Federal Research and Technical Assistance Act beyond its expiration date of 1960 and thus assure continued Federal assistance in grants to States, research, training, demonstrations, consultation, and other technical aid.

The proceedings of the conference constitute an up-to-date reference book since it reports in full the papers given by some 90 authorities in industry, government, and other organizations, together with detailed discussion of papers by persons with varying viewpoints.

### **Radiological Health**

The radiological health program of the Public Health Service has also been expanding rapidly and should become an increasingly valuable source of help in dealing with occupational health and even broader problems of radiation. A special Division of Radiological Health was established last year and is staffed with specialists in both medical and engineering aspects.

Like the air pollution program, the radiological health program conducts and supports research, carries on a training program with courses at the Sanitary Engineering Center and in other parts of the country, and provides consultation and technical assistance to States and communities upon request. Also like air pollution, the program, despite rapid expansion, still lacks sufficient staff and other resources to give as much help as one might wish.

Even if one considers only the occupational aspect of radiological health, its scope and predictable growth are truly formidable:

- It is estimated that 175,000 persons are currently employed in atomic energy industry. Thousands of other workers are engaged in operations involving the use of X-rays and radioactive substances.

- Two thousand hospitals and other institutions are licensed to use radioisotopes for medical purposes.

- A study underway by the occupational health program of the Public Health Service indicates that in at least one industry, uranium mining, the protections now available to workers are not yet adequate. About 64 percent of the miners in the Colorado plateau area, where most uranium mining is done, were found to be exposed to dangerously excessive concentrations, at least fivefold in excess of the desirable working standard.

The rapid growth in the past few years in the number of workers dealing with radioactive materials is as nothing compared with the

growth we shall see in the immediate years ahead. The tremendous task of learning more about the health hazards to the workers involved and of finding effective control measures must be shared by government at all levels and by industry.

Better application of existing knowledge, however, can accomplish much even now. We have recently had a dramatic demonstration of this among our own employees in Public Health Service hospitals. In July 1958, continuous film badge monitoring was initiated in most of the Public Health Service hospitals, outpatient clinics, and field medical units. More than 1,600 film badges have been worn for 1-month periods by personnel working in and around X-rays and other sources of radiation. Analysis of the film badge reports for August 1958-January 1959 indicates a progressive decrease in the number of badges which exceeded an exposure of 30 milliroentgens per week. This exposure is the practical maximum exposure which need not be exceeded by hospital personnel taking necessary precautions. Using this limit, 6.5 percent of the film badge wearers were overexposed the first 2 months and only 0.5 percent in the last 2 months, or a decrease from 31 to 3 needlessly large exposures.

Similar episodes could no doubt be recounted, for almost invariably a real drive to reduce radiation exposure of workers produces impressive results.

We are happy, therefore, to note that the States are exhibiting an increasing awareness and interest in the public health problem of radiation exposure. This is denoted in the increasing number of requests for consultative and technical assistance in coping with radiation problems, ranging from specific technical questions to assistance in development of comprehensive programs in radiation protection. Consequently, the following activities have been initiated in response to such expressed needs:

- Assistance in the development, organization, and operation of State health agency radiation programs. Such assistance is being provided by both headquarters and regional consultants, and, in some instances, by the assignment of trained Division of Radiological Health personnel to States on a full-time basis.

- Consultation on State legislation and rules and regulations for the control of radiation hazards.

- Demonstration projects on public health methods for the reduction of radiation exposure to the public from clinical use of X-rays.

- Technical aid in surveys and monitoring programs designed to determine the amount and effect of radioactive contamination and the extent of radiation exposure to our population.

- Assistance in evaluating the adequacy of proposed radioactive waste treatment and disposal mechanism in reactor facilities and in radioisotopes usages.

- Provision of information to communities near the site of reactor operations including: advice on the protective measures to be employed in connection with site selection; the outlining of laboratory or other radiation measuring methods considered necessary to determine the amount of radioactive contamination or exposure to individuals; and the proper interpretation of the results and effectiveness of various radiation protection methods or decontamination procedures.

The current program is in a transitional stage and, depending on the resources available to it, will develop in the coming months along lines best calculated to aid in the development of State activities.

Particularly significant to the future development of the radiological health program are the hearings which the Joint Committee on Atomic Energy is now conducting. The report of the Public Health Service National Advisory Committee on Radiation also suggests activity levels and assignment of responsibilities. Both documents deal extensively with the respective roles of Federal and State governments.

At the Joint Committee hearings 2 years ago, Merrill Eisenbud, manager of the New York operations office of the Atomic Energy Commission, pointed out that one reason why so many unanswered questions about radiation effects exist is that we know so much, rather than so little. "It is simply characteristic of good research that answers beget questions," he said, pointing to the disparity in the funds invested in radiation studies as contrasted with air pollution and other areas. He concluded that

if full information about organic chemicals and heavy metals were available, we should be asking the biologists many of the same kind of questions we are asking them today in regard to radiation effects.

### **Occupational Health Program Activities**

It is imperative that we learn more about the new products that are being introduced so rapidly into general daily use in homes, farms, and factories. We realize, however, that the sheer number of chemicals being introduced each year as industrial compounds or intermediates precludes comprehensive toxicological screening. We in the Public Health Service also recognize that our own research efforts in this area have not kept pace with the problem and its needs. It is our hope that the toxicological and other activities of the occupational health program can be strengthened. The National Health Forum at its meeting in Chicago, March 17-19, 1959, strongly underscored the need for expanded Federal participation in occupational health activities. It particularly stressed the need for more epidemiological studies.

We believe that a first step in protecting the growing numbers of workers exposed to industrial chemicals is basic research to develop more efficient methods of toxicological evaluation. One such need is for the development of adequate testing procedures which will permit prediction with greater accuracy of the effects of long-term exposures. Also needed is the development of diagnostic procedures which, when applied to man, will detect changes long before permanent change has occurred.

The occupational health program has recently begun experimental work in this field of preventive industrial toxicology. The research which resulted in the discovery that vanadium poisoning can be detected by changes in the fingernails long before any clinical symptoms appear is the first fruit of a program that we hope will yield many other equally valuable findings in the coming years.

Another specific activity that we would like to strengthen is the occupational health information exchange. We hope to develop it into a central source of information on the toxicity

of chemical compounds, hazards associated with new processes, disease problems in industry, and control methods. The exchange was started rather recently on an experimental basis and seems to be meeting a long-felt need.

Emphasis will also continue to be placed on field studies, which are indispensable to occupational health progress. At present, the occupational health program has several studies underway which concern large segments of the working population. One of these concerns the effects of industrial noise on hearing, an extremely serious problem intensified by increasing off-the-job background noises. Another study, being conducted jointly with the U.S. Bureau of Mines in the western metal mines, seeks to determine how and where silicosis may be occurring. This problem remains the most significant occupational disease in terms of disability and compensation. Still continuing is the long-term study of radiation effects in uranium mining, to which I referred previously. These are just a few of the field studies which we hope will increase in number and scope.

Everyone in occupational health feels most keenly the great need to improve and expand our mechanism for collecting and reporting information on the health status of workers. Employee health programs, with periodic appraisals of health status, can contribute greatly to such epidemiological research. This is one strong reason, among many others, why we must find ways to reach workers in small establishments with employee health programs.

### **Basic Approaches**

We need to develop a much larger amount of biological content in all programs that involve the environment. This can be done only if the engineer, the chemist, the biologist, the physician, and other specialists operate as a closely knit team.

Such teamwork is being fostered in every possible way within the Bureau of State Services. For example, in the Radiological Health Division, physicians and engineers develop policies and projects jointly. In the air pollution program, although organizationally separated, physicians and engineers share the same office

quarters in Washington and work in the same laboratories in Cincinnati, with the end result that there is joint planning and operation.

To strengthen such coordination at the administrative level, Mark D. Hollis, formerly chief of the Division of Sanitary Engineering Services, has been recently appointed associate chief of the Bureau of State Services. With his assistance as a member of my immediate staff, we expect to achieve an even greater degree of integration in engineering and medical programs. We hope to improve steadily our ability to channel, through our regional offices, whatever combination of medical, engineering, or other specialized consultant services may be needed in developing local programs.

In considering needs for future activity in the fields of environmental health, attention should be given to the published Hearings of the House Subcommittee on Appropriations which were released April 24, 1959. At the request of Chairman Fogarty, Congressman from Rhode Island, Dr. Leroy E. Burney, Surgeon General of the Public Health Service, emphasized the needs in the years ahead:

“In the present stage of thinking, it would seem desirable to establish some centers where orientation would be to particular problems of man in his environment and where research and studies of a specific type of community or industry, or environmental contaminant or influence could be carried out. Within these centers, technical assistance could be made available and training could be given in support of the total public health effort of the various components of the Service and of the States. . . .

“Our planning for expansion of program and facilities at Cincinnati in sanitary engineering, air pollution, water pollution, occupational health, toxicology, and radiological health is quite advanced. We do not believe that all of the needs of the Service in these fields can be met at any one geographic site; nor that the total needs of the Nation should be met in Federal governmental facilities. It will therefore be prudent to plan for eventual development of a number of centers, utilizing, where feasible, established educational and research organizations.”

Just as the team approach envisioned by Dr. Burney in this statement is the best way to study the complex problems of man and his environment so, I believe, the educational approach offers the best way of getting something done about them. The writing into law of maximum allowable concentrations and other

criteria can some day be helpful, when we are confident what such criteria should be. But more necessary than legal criteria are the educational efforts which prompt labor, management, and the general public to take voluntarily those actions which will contribute to a healthier environment for all.

## PUBLICATION AND FILM ANNOUNCEMENTS

*The publications and films selected for this list have been issued by or produced for State, local, voluntary, or other organizations associated with public health. Address inquiries to the publisher, sponsoring agency, or distributor.*

*To Your Health.* Film on alcohol and alcoholism presented by the World Health Organization. Designed and directed by Philip Stapp. 16 mm., color, 10 minutes; \$100, including shipping in the United States. Center for Mass Communication, a Division of Columbia University Press, 1125 Amsterdam Avenue, New York 25, N.Y.

*Rescue Breathing.* Safety film teaching mouth-to-mouth and mouth-to-nose method of reviving suffocation victims. Written, produced, and directed by Lewis and Marguerite S. Herman. 16 mm., black and white or color, sound, 21 minutes, 24 seconds; 1 to 5 prints, black and white, \$110 each; color, \$200 each; reduction for 6 or more prints. American Film Producers, 1600 Broadway, New York 19, N.Y.

*Current Research and Development in Scientific Documentation, No. 4.* Compiled by Mrs. Madeline M. Henderson, National Science Foundation. April 1959; 85 pages; 15 cents. U.S. Government Printing Office, Washington 25, D.C.

*Field and Clinical Survey Report of the Mental Health of the Indigenes of the Territory of Papua and New Guinea.* Prepared by Alex. Sinclair, M.D., M.R.C.P., F.R.A.C.P. 1957; 59 pages. W. S. Nicholas, Government Printer, Port Moresby, Territory of Papua and New Guinea.

*All the Years.* A filmstrip depicting contributions of a community center to the lives of older people. 72 frames, black and white, with record and script, 15 minutes; \$9, including packing and shipping. Leo Seltzer Associates, Inc., 368 East 69th Street, New York 21, N.Y.

*The Physician and Labor Health Plans.* 1959; 18 pages; 20 cents. American Labor Health Association, 16 East 16th Street, New York 3, N.Y.

*Toward Understanding Stuttering.* By Wendell Johnson, Ph.D. 1959; 40 pages; 25 cents. National Society for Crippled Children and Adults, 2023 West Ogden Avenue, Chicago 12, Ill.

*24 Hours Make a Year. Annual Report of the Council on Alcoholism, 1958-59.* 1959; leaflet; no charge for single copies. Council on Alcoholism, Public Health Federation, 312 West Ninth Street, Cincinnati 2, Ohio.

*Hints for Programs on Health.* June 1959; 10 pages; no charge for single copies. Health Education Council, Public Health Federation, 312 West Ninth Street, Cincinnati 2, Ohio.

*A Guide to Public Health Program Accounting.* Prepared by the Committee on Program Budgeting and Accounting of the Association of Business Management in Public Health. December 1958; 83 pages; \$1. Mr. Ernest B. Davis, President-Elect, Association of Business Management in Public Health, Georgia State Department of Health, State Office Building, Atlanta 3, Ga.

*VA Prospectus, Research in Aging.* Transcription of a meeting of the Veterans Administration Advisory Committee on Problems of Aging and guest experts, edited by Dr. Charles C. Chapple. 1959; 125 pages; \$1.50. U.S. Government Printing Office, Washington 25, D.C.

*Health in the Mexican-American Culture. A Community Study.* By Margaret Clark. Study sponsored by the Rosenberg Foundation. 1959; 253 pages; \$5. University of California Press, Berkeley and Los Angeles.

*Urban Sprawl and Health.* Report of the 1958 National Health Forum. 1959; 228 pages; \$1.75. National Health Council, 1790 Broadway, New York 19, N.Y.

*Radiation: Physician and Patient.* Comprehensive film on diagnostic radiology: its biological effects, physical behavior, and proper use in clinical situations. Presented by the American College of Radiology in cooperation with the Public Health Service, supported by a grant from the Rockefeller Foundation. 16 mm., color, sound motion picture, 45 minutes. Prints can be obtained for professional use without charge from: American College of Radiology, 20 North Wacker Dr., Chicago 6, Ill.; American Medical Association, Film Library, 535 North Dearborn Street, Chicago 10, Ill.; Division of Radiological Health, Public Health Service, Washington 25, D.C.; any regional office of the Department of Health, Education, and Welfare, or any State health department.

## Calendar of Health Department Events

A SIMPLE CALENDAR devised by the Calhoun County Health Department in Michigan has proved effective in helping all parts of the organization to anticipate forthcoming events.

Serving a population of approximately 142,000, the department has a staff of 32 persons in a ratio of 3 professional staff members to 1 clerical assistant. The total annual budget is less than \$190,000, of which \$165,000 is provided from county taxes by the board of supervisors.

Like its counterparts, the Calhoun County Health Department has certain established programs and responsibilities:

- Laboratory procedures.
- Home and traffic safety.
- Student affiliation.
- Civil defense.
- Staff education and meetings.
- Immunizations by triple antigen and poliomyelitis and smallpox vaccines.
- Reports.
- Mental health.
- Tuberculosis.
- Crippled children, school children, and maternal care.

In addition, there are established programs which must be accomplished on a seasonal basis within a short period of time, such as:

- Topical application of fluoride.
- Spring cleanup.
- Food establishment inspection.
- Trailer park and camp inspection.
- Immunization of school children.
- Nursing home inspection.
- Participation in meetings.

The department is also called upon to participate in certain campaigns and community activities which not only have value in themselves, but assist in the establishment of community

rapport. Examples are annual drives directed to public knowledge of diabetes, farm safety, fire prevention, spring cleanup, Christmas safety, and mental health.

The schedule of events entered on the calendar allows employees to evaluate the prospective workload at a glance. It gives a quick view of the periods of the year filled with scheduled activities and periods which conceivably may be used to develop a new program or emphasize existing programs.

Once it is fully determined that a scheduled program or event no longer has public health significance, it soon yields its place on the calendar to others.

The calendar is especially useful in planning public information campaigns, allowing time for gathering new and pertinent information and evaluating past procedures.

Also each division in the department becomes aware, in general terms at least, of the anticipated activities of other divisions, through use of the schedule of events. It alerts officials in many instances to opportunities for cooperation between divisions that might not otherwise be explored. Public health nursing and sanitation activities in particular have been coordinated by this process, so that they may share effectively in information services, or perhaps time their use of laboratory facilities at periods that are opportune.

A sample of the calendar, reproduced on facing page, is modified to meet the mechanical limitations of the printed page. The calendar used at Battle Creek is constructed to permit each user to write in a new or temporary project.

—GEORGE M. WATSON, M.S.P.H., *consultant in health education, Calhoun County Health Department, Battle Creek, Mich.*

Winter			Spring			Summer			Fall		
Dec.	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.
<b>ADMINISTRATION</b>											
							—————>			—————>	
<b>SANITATION</b>											
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<b>LABORATORY</b>											
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Diagram (above) of the calendar the Calhoun County Health Department uses to note activities. Reproduction of the nursing section (below) shows typical entries.

NURSING				
Review Tbc. Register	Review Past Yrs. Polio. Cases		Prep. for Enter School Child	—————>
Inspect Nursing Homes	Review Crippled Child Register			Participate in planning Topical Fluoride Program
Hearing Screening	—————>	—————>	Hearing Rechecks	Hearing Followup
Follow Tbc. Cases & Contacts	—————>	—————>		—————>